

PACIFIC NORTHWEST
FOREST PEST CONDITIONS
DURING 1982

Compiled by

USDA Forest Service
Oregon State Department of Forestry
Washington State Department of Natural Resources
Oregon Department of Agriculture

INSECT CONDITIONS - 1982

Bark beetle-caused damage was slightly reduced in 1982. On the other hand, defoliators appear to be increasing over the Region.

Douglas-fir beetle-caused damage has been in a steady decline for the last 5 years. This year's decline is due to major reductions in activity west of the Cascade Mountains.

Mountain pine beetle populations are static; however, losses remain high, with over 24.4 million cubic feet of timber lost on 789,490 acres.

Fir engraver and western pine beetle activity were little changed over the last year.

The western spruce budworm continues to increase in Oregon where 1.5 million acres were defoliated.

The Douglas-fir tussock moth is again at a higher population level with some minor defoliation in northeast Washington. Elsewhere, tussock moth populations are showing what appears to be the start of a decline in population densities.

For the first time since insect conditions record keeping began in 1947, the pine butterfly has caused some defoliation in Central Oregon.

TREND OF MAJOR INSECT PESTS
IN
PACIFIC NORTHWEST 1978-82

Insect	Acres Infested				
	1978	1979	1980	1981	1982
Douglas-fir Beetle	46,450	37,480	13,650	16,610	10,980
Mt. Pine Beetle	1,910,240	1,225,710	1,086,250	715,270	789,490
Western Pine Beetle	241,930	110,800	52,970	23,600	21,030
Fir Engraver	41,410	25,710	18,550	12,680	6,850
Flatheaded Borer	13,360	1,040	0	0	0
W. Spruce Budworm	198,950	406,660	132,430	342,690	1,540,000
D-F Tussock Moth	10,080	0	0	0	1,550
Pine Butterfly	0	0	0	0	2,650
Larch Looper	0	0	0	60,550	23,590

FOREST PEST CONDITIONS
PACIFIC NORTHWEST
1981-1982

Pest	Acres Infested	
	1981	1982
Douglas-fir Beetle	16,610	10,980
Engelmann Spruce Beetle	0	5,250
Douglas-fir Engraver	1,650	0
Fir Engraver	12,680	6,850
Mt. Pine Beetle	715,270	789,490
Pine Engraver	16,150	7,410
Western Pine Beetle	23,600	21,030
W. Spruce Budworm	342,690	1,540,000
Douglas-fir Tussock Moth	0	1,550
Larch Looper	60,550	23,590
Pine Butterfly	0	2,650
Blackheaded Budworm	320	0
Needle Miners	0	1,490
Balsam Woolly Aphid	1,750	570
Modoc Budworm	0	4,950
Spruce Aphid	2,750	0
Douglas-fir Needle Midge	0	38,810
Black Pine Needle Scale	0	2,970
	1,198,970	2,457,590

TREND OF FOREST PEST CONDITIONS
OREGON
1981-1982

Pest	Acres Infested	
	1981	1982
D-F Beetle East Side	4,570	5,270
D-F Beetle West Side	4,550	30
Douglas-fir Engraver	160	0
Fir Engraver	7,310	2,710
Mt. Pine Beetle (P.P.)	67,630	55,580
Mt. Pine Beetle (S.P.)	860	0
Mt. Pine Beetle (W.W.P.)	950	1,820
Mt. Pine Beetle (L.P.P.)	522,080	615,390
Pine Engraver	15,100	5,940
Western Pine Beetle	7,790	8,090
Black Pine Needle Scale	0	2,970
Pine Butterfly	0	2,650
Needle Miners	0	1,490
W. Spruce Budworm	312,640	1,530,730
Modoc Budworm	0	4,950
Douglas-fir Needle Midge	0	38,810
	946,150	2,276,430

TREND OF FOREST PEST CONDITIONS
WASHINGTON
1981-1982

Pest	Acres Infested	
	1981	1982
D-F Beetle East Side	5,970	4,860
D-F Beetle West Side	1,520	820
Spruce Beetle	0	5,250
Douglas-fir Engraver	1,490	0
Fir Engraver	5,370	4,140
Mt. Pine Beetle (P.P.)	25,870	11,420
Mt. Pine Beetle (W.W.P.)	57,830	30,150
Mt. Pine Beetle (L.P.P.)	40,050	75,090
Mt. Pine Beetle (W.B.P.)	0	40
Pine Engraver	1,050	1,470
Western Pine Beetle	15,810	12,940
Balsam Woolly Aphid	1,750	570
Spruce Aphid	400	0
Larch Looper	60,550	23,590
W. Spruce Budworm	30,050	9,270
Bear Damage	4,790	0
Douglas-fir Tussock Moth	0	1,550
	252,500	181,160

SUMMARY OF 1982 BARK BEETLE INFESTATIONS BY OWNERSHIPS
IN OREGON AND WASHINGTON
(EXCLUDING IPS)

INSECT SPECIES	FOREST SERVICE (COM.FOR.LANDS)		OTHER FEDERAL (BLM & BIA)		DEDICATED LANDS (WILD & NAT. PARKS)		STATE AND PRIVATE LANDS		TOTAL ALL FOREST LANDS	
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	ACRES	MCF	ACRES	MCF	ACRES	MCF	ACRES	MCF	ACRES	MCF
Douglas-fir Beetle, East Side DF	4360	198.16	160	11.20	250	8.61	500	29.77	5270	247.74
Douglas-fir Beetle, West Side DF	10	1.48	0	0.00	0	0.00	20	1.48	30	2.96
Fir Engraver	2040	22.59	70	1.84	0	0.00	600	6.83	2710	31.26
Mtn. Pine Beetle, Ponderosa Pine	32940	534.66	1190	4.20	140	2.15	21310	344.96	55580	885.97
Mtn. Pine Beetle, W. White Pine	620	14.30	1190	43.70	0	0.00	10	.43	1820	58.43
Mtn. Pine Beetle, Lodgepole Pine	526550	17661.71	8420	174.69	18130	346.45	62290	1837.74	615390	20020.59
Western Pine Beetle	6950	117.01	380	7.19	20	.72	740	22.58	8090	147.50
Total Oregon	573470	18549.91	11410	242.82	18540	357.93	85470	2243.79	688890	21394.45
Douglas-fir Beetle, East Side DF	1930	102.21	470	16.12	10	.55	2450	111.52	4860	230.40
Douglas-fir Beetle, West Side DF	430	43.97	0	0.00	0	0.00	390	35.33	820	79.30
Engelmann Spruce Beetle	660	16.82	0	0.00	4530	942.24	60	1.61	5250	960.67
Fir Engraver	1470	40.17	990	14.80	360	8.96	1320	52.74	4140	116.67
Mtn. Pine Beetle, Ponderosa Pine	570	3.52	2170	7.33	0	0.00	8680	53.42	11420	64.27
Mtn. Pine Beetle, W. White Pine	20820	980.67	710	16.61	3130	97.24	5490	238.53	30150	1333.05
Mtn. Pine Beetle, Lodgepole Pine	63570	1867.09	2500	86.53	6250	82.95	2770	21.79	75090	2058.36
Mtn. Pine Beetle, Whitebark Pine	20	.08	0	0.00	0	0.00	20	.39	40	.47
Western Pine Beetle	3270	75.08	4890	110.96	0	0.00	4780	136.89	12940	322.93
Total Washington	92740	3129.61	11730	252.35	14280	1131.94	25960	652.22	144710	5166.12
Total for Region	666210	21679.52	23140	495.17	32820	1489.87	111430	2896.01	833600	26560.57

East Side Douglas-fir Beetle, *Dendroctonus pseudotsugae* Hopk.

Damage caused by the Douglas-fir beetle east of the Cascade Mountains remains at a low level. Acres infested changed little from the 10,540 mapped in 1981 to 10,130 in 1982. Most of the damage occurred on the Umatilla and Wallowa-Whitman National Forests and the Warm Springs Indian Reservation. Damage is concentrated in areas defoliated by the Douglas-fir tussock moth during the 1972-74 outbreak and in western spruce budworm-defoliated areas in more recent years.

EXTENT OF DOUGLAS-FIR BEETLE, EAST SIDE DF
IN 1982 BY REPORTING AREA AND VOL. LOSS

REPORTING AREA	INFESTATION CENTERS		NUMBER OF TREES	VOLUME MCF
	NUMBER	ACRES		
Total Deschutes NF	1	30	20	2.580
Total Malheur NF	1	10	5	.540
Total Ochoco NF	1	20	5	.540
Total Umatilla NF	28	970	195	21.370
Total Wallowa-Whitman NF	100	4060	2081	210.370
Total Winema NF	1	10	5	.600
Total Warm Springs IR	6	160	70	11.200
Total Central Oregon	1	10	5	.540
Total Oregon	139	5270	2386	247.740
Total Okanogan NF	22	740	365	41.300
Total Umatilla NF	7	270	60	6.570
Total Wenatchee NF	37	990	417	42.230
Total Colville NF	53	2150	1030	112.400
Total Colville IR	10	400	135	13.390
Total Northeast WA	6	180	66	8.400
Total Glenwood	5	130	56	6.110
Total Washington	140	4860	2129	230.400
Total for Region	279	10130	4515	478.140

West Side Douglas-fir Beetle, *Dendroctonus pseudotsugae* Hopk.

Douglas-fir beetle activity west of the Cascade Mountains in Oregon and Washington was again at a very low level in 1982. Damaged and dead timber from the 1980 eruption of Mount St. Helens has caused few beetle population increases of significance. There was an increase of beetle attacks on Douglas-firs apparently damaged by mudflows along the Muddy River southeast of Mount St. Helens. These trees were salvaged in summer 1982 before brood emergence. Observations will continue as long as damaged timber remains suitable for the beetle.

EXTENT OF DOUGLAS-FIR BEETLE, WEST SIDE DF
IN 1982 BY REPORTING AREA AND VOL. LOSS

REPORTING AREA	INFESTATION CENTERS		NUMBER OF TREES	VOLUME MCF
	NUMBER	ACRES		
Total Mt. Hood NF	2	30	10	2.960
Total Oregon	2	30	10	2.960
Total Gifford Pinchot NF	40	820	413	79.300
Total Washington	40	820	413	79.300
Total for Region	42	850	423	82.260

Spruce Beetle, *Dendroctonus rufipennis* (Kirby)

Activity of the spruce beetle caused low level to moderate losses in Engelmann spruce stands of north-central Washington. Heaviest losses were found on the Okanogan National Forest. Minor losses occurred on the Wenatchee and Colville National Forests.

EXTENT OF SPRUCE BEETLE
IN 1982 BY REPORTING AREA AND VOL. LOSS

REPORTING AREA	INFESTATION CENTERS		NUMBER OF TREES	VOLUME MCF
	NUMBER	ACRES		
Total Okanogan NF	9	4530	18120	942.240
Total Wenatchee NF	5	140	80	3.680
Total Colville NF	6	580	295	14.750
Total Washington	20	5250	18495	960.670
Total for Region	20	5250	18495	960.670

Fir Engraver, *Scolytus ventralis* (Lec.)

Fir engraver activity decreased in Washington, both in acreage infested and volume lost. A major part of this tree mortality occurred on the east slope of the Cascade Range in Washington. In Oregon, most damage occurred in the Blue Mountains on the Umatilla National Forest.

EXTENT OF FIR ENGRAVER
IN 1982 BY REPORTING AREA AND VOL. LOSS

REPORTING AREA	INFESTATION CENTERS		NUMBER OF TREES	VOLUME MCF
	NUMBER	ACRES		
Total Deschutes NF	2	20	10	.860
Total Fremont NF	2	50	10	.800
Total Malheur NF	1	40	5	.250
Total Mt. Hood NF	2	20	10	.920
Total Ochoco NF	2	40	10	.500
Total Umatilla NF	29	1600	270	13.500
Total Wallowa-Whitman NF	6	110	30	1.080
Total Winema NF	11	740	150	11.260
Total Warm Springs IR	2	70	20	1.840
Total Central Oregon	1	20	5	.250
Total Oregon	58	2710	520	31.260
Total Gifford Pinchot NF	13	360	300	27.320
Total Okanogan NF	21	880	535	27.820
Total Umatilla NF	8	310	50	2.500
Total Wenatchee NF	37	990	415	22.930
Total Colville NF	15	270	240	12.000
Total Colville IR	4	110	70	3.500
Total Yakima IR	16	880	205	11.300
Total Glenwood	11	340	186	9.300
Total Washington	125	4140	2001	116.670
Total for Region	183	6850	2521	147.930

Mountain Pine Beetle, *Dendroctonus ponderosae*, Hopk.

Mountain pine beetle losses continued throughout Oregon and Washington. This beetle is still the most destructive tree killer in the Pacific Northwest. Region-wide, 24.4 million cubic feet of timber were killed on 789,490 acres. Tree mortality continued to decline in older areas of the outbreak in north-east Oregon, primarily because the most suitable host material already has been killed. Mortality totaled in excess of 24 million cubic feet, with 20 million of this volume being in lodgepole pine stands in Oregon. Greatest damage in Washington occurred on the Colville National Forest where 1.6 million cubic feet of lodgepole pine were killed.

EXTENT OF MTN. PINE BEETLE, LODGEPOLE PINE
IN 1982 BY REPORTING AREA AND VOL. LOSS

REPORTING AREA	INFESTATION CENTERS		NUMBER OF TREES	VOLUME MCF
	NUMBER	ACRES		
Total Deschutes NF	482	307070	740659	11110.410
Total Fremont NF	151	58950	187869	2630.170
Total Malheur NF	183	43170	62361	873.060
Total Mt. Hood NF	3	170	35	.490
Total Ochoco NF	66	16930	39340	472.080
Total Umatilla NF	94	25390	24952	349.340
Total Umpqua NF	8	3610	7500	82.510
Total Wallowa-Whitman NF	265	60200	98459	1280.110
Total Winema NF	168	93880	217525	3045.360
Total Warm Springs IR	25	4970	9325	149.200
Total Central Oregon	3	1050	1990	27.860
 Total Oregon	 1448	 615390	 1390015	 20020.590
 Total Gifford Pinchot NF	 4	 4380	 9815	 157.040
Total Okanogan NF	70	8720	7710	107.940
Total Umatilla NF	12	1210	380	5.320
Total Wenatchee NF	29	3050	4025	52.360
Total Colville NF	195	55090	117752	1648.530
Total Colville IR	13	1400	5660	79.240
Total Yakima IR	4	1100	560	7.290
Total Northeast WA	2	140	40	.640
 Total Washington	 329	 75090	 145942	 2058.360
 Total for Region	 1777	 690480	 1535957	 22078.950

EXTENT OF MTN. PINE BEETLE, PONDEROSA PINE
IN 1982 BY REPORTING AREA AND VOL. LOSS

REPORTING AREA	INFESTATION CENTERS		NUMBER OF TREES	VOLUME MCF
	NUMBER	ACRES		
Total Deschutes NF	56	7980	11545	196.320
Total Fremont NF	191	19310	12167	194.670
Total Malheur NF	55	2830	1095	10.950
Total Mt. Hood NF	1	10	5	.060
Total Ochoco NF	32	1230	370	3.700
Total Umatilla NF	67	3570	1985	87.340
Total Wallowa-Whitman NF	117	11250	7580	326.170
Total Winema NF	49	7930	3825	61.200
Total Warm Springs IR	11	960	210	3.360
Total Central Oregon	21	510	220	2.200
Total Oregon	600	55580	39002	885.970
Total Gifford Pinchot NF	5	750	400	5.600
Total Okanogan NF	57	4010	1770	17.700
Total Umatilla NF	1	80	10	.440
Total Wenatchee NF	48	2640	1935	21.380
Total Colville NF	36	570	380	3.800
Total Colville IR	40	1200	545	5.450
Total Yakima IR	12	970	170	1.880
Total Northeast WA	10	210	203	2.440
Total Glenwood	11	990	465	5.580
Total Washington	220	11420	5878	64.270
Total for Region	820	67000	44880	950.240

EXTENT OF MTN. PINE BEETLE, W. WHITE PINE
IN 1982 BY REPORTING AREA AND VOL. LOSS

REPORTING AREA	INFESTATION CENTERS		NUMBER OF TREES	VOLUME MCF
	NUMBER	ACRES		
Total Deschutes NF	15	590	150	12.900
Total Mt. Hood NF	3	40	15	1.830
Total Warm Springs IR	13	1190	475	43.700
Total Oregon	31	1820	640	58.430
Total Gifford Pinchot NF	23	830	295	35.730
Total Okanogan NF	59	4660	1295	143.800
Total Wenatchee NF	288	14850	7315	607.610
Total Colville NF	76	8240	5396	480.340
Total Yakima IR	13	710	200	16.610
Total Northeast WA	9	770	390	40.560
Total Glenwood	3	90	80	8.400
Total Washington	471	30150	14971	1333.050
Total for Region	502	31970	15611	1391.480

EXTENT OF MTN. PINE BEETLE, WHITEBARK PINE
IN 1982 BY REPORTING AREA AND VOL. LOSS

REPORTING AREA	INFESTATION CENTERS		NUMBER OF TREES	VOLUME MCF
	NUMBER	ACRES		
Total Gifford Pinchot NF	1	20	5	.080
Total Wenatchee NF	1	20	30	.390
Total Washington	2	40	35	.470
Total for Region	2	40	35	.470

Pine Engraver, *Ips pini* (Say)

Activity of the pine engraver continues at a low level. Regionwide, 7,410 acres were infested in 1982. Most of the activity was centered on the Fremont and Ochoco National Forests in Oregon.

EXTENT OF PINE ENGRAVER
IN 1982 BY REPORTING AREA

REPORTING AREA	NUMBER OF INFESTATION CENTERS	ACRES OF DAMAGE
Total Wallowa-Whitman NF	2	90
Total Fremont NF	46	3000
Total Malheur NF	5	130
Total Mt. Hood NF	3	140
Total Ochoco NF	11	1430
Total Umatilla NF	1	10
Total Wallowa-Whitman NF	1	30
Total Winema NF	6	750
Total Warm Springs IR	1	20
Total Central Oregon	8	340
Total Oregon	84	5940
Total Okanogan NF	6	490
Total Wenatchee NF	10	460
Total Colville IR	4	60
Total Yakima IR	7	290
Total Northeast WA	2	170
Total Washington	29	1470
Total for Region	113	7410

Western Pine Beetle, *Dendroctonus brevicomis* LeConte

Tree mortality caused by the western pine beetle continued at a low level. In 1982, infested area was 21,030 acres with 470.4 MCF of timber killed. Current damage is greatest on the Deschutes, Fremont and Ochoco National Forests in Oregon and on the Okanogan and Wenatchee National Forests and Yakima Indian Reservation in Washington. Some activity has occurred on all Forests and Indian Reservations within the host range.

EXTENT OF WESTERN PINE BEETLE
IN 1982 BY REPORTING AREA AND VOL. LOSS

REPORTING AREA	INFESTATION CENTERS		NUMBER OF TREES	VOLUME MCF
	NUMBER	ACRES		
Total Deschutes NF	23	1360	170	28.900
Total Fremont NF	47	2620	350	55.120
Total Malheur NF	13	880	90	12.920
Total Ochoco NF	19	1850	125	19.700
Total Umatilla NF	3	60	20	2.550
Total Wallowa-Whitman NF	6	300	30	4.320
Total Winema NF	14	670	105	17.590
Total Warm Springs IR	8	350	40	6.400
Total Oregon	133	8090	930	147.500
Total Gifford Pinchot NF	3	220	60	7.270
Total Okanogan NF	40	2060	350	39.680
Total Umatilla NF	1	30	5	.640
Total Wenatchee NF	55	3300	1255	101.780
Total Colville NF	16	660	191	20.470
Total Colville IR	13	580	125	12.650
Total Yakima IR	24	4310	840	98.310
Total Glenwood	17	1780	401	42.130
Total Washington	169	12940	3227	322.930
Total for Region	302	21030	4157	470.430

Balsam Woolly Aphid, *Adelges piceae* (Ratz)

Balsam woolly aphid infestations continued to decrease in 1982. Number of visible infestation centers decreased from 18 in 1981 to 6 in 1982. In 1982, 570 acres were mapped on the Gifford Pinchot and Wenatchee National Forests in Washington.

EXTENT OF BALSAM WOOLLY APHID
IN 1982 BY REPORTING AREA

REPORTING AREA	NUMBER OF INFESTATION CENTERS	ACRES OF DEFOLIATION
Total Gifford Pinchot NF	5	560
Total Wenatchee NF	1	10
Total Washington	6	570
Total for Region	6	570

Black Pine Leaf Scale, *Nuculaspis californica* (Coleman)

This common pest caused moderate defoliation on 2,970 acres of the Winema National Forest in southern Oregon.

EXTENT OF BLACK PINE LEAF SCALE
IN 1982 BY REPORTING AREA

REPORTING AREA	NUMBER OF INFESTATION CENTERS	ACRES OF DEFOLIATION
Total Winema NF	4	2970
Total Oregon	4	2970
Total for Region	4	2970

Douglas-fir Tussock Moth, *Orgyia pseudotsugata* (McDonnough)

Populations continue to increase in northeast Washington where 1,550 acres of light to heavy defoliation occurred in 1982. Pheromone-baited traps also reflect the higher populations. All surveys, however, indicate that if serious defoliation does occur, it will not be before 1984 or 1985. Surveys elsewhere in the Region show a static to a downward trend in population levels.

EXTENT OF DOUGLAS-FIR TUSOCK MOTH
IN 1982 BY REPORTING AREA

REPORTING AREA	NUMBER OF INFESTATION CENTERS	ACRES OF DEFOLIATION
Total Colville NF	10	1420
Total Colville IR	1	130
Total Washington	11	1550
Total for Region	11	1550

Western Spruce Budworm, *Choristoneura occidentalis* (Freeman)

In Region 6, the area of visible defoliation increased from 342,690 acres in 1981 to 1,540,000 acres in 1982. Activity in Oregon was on the Malheur, Umatilla, Ochoco, and Wallowa-Whitman National Forests and adjacent State, private and Bureau of Land Management property. In Washington, small centers of infestations continued on the Okanogan, Wenatchee, and Colville National Forests.

During 1982, 178,000 acres were treated with carbaryl and acephate in eastern Oregon.

Egg masses sampled from 411 plots in eastern Oregon indicate continued widespread defoliation in 1982. An environmental analysis of the budworm infestation is being conducted.

Budworm populations appear to be decreasing in Washington with detected defoliation decreasing from 30,000 acres in 1981 to 9,000 in 1982.

Modoc Budworm, *Choristoneura viridis* (Freeman)

Moderate defoliation by this budworm occurred on true firs on the Fremont and Winema National Forests in southern Oregon. This outbreak is expected to continue into 1983.

EXTENT OF SPRUCE BUDWORM
IN 1982 BY REPORTING AREA

REPORTING AREA	NUMBER OF INFESTATION CENTERS	ACRES OF DEFOLIATION
Total Malheur NF	358	729360
Total Ochoco NF	86	137980
Total Umatilla NF	203	450490
Total Wallowa-Whitman NF	102	175600
Total Central Oregon	21	37300
Total Oregon	770	1530730
Total Okanogan NF	23	7720
Total Wenatchee NF	5	1030
Total Colville NF	3	520
Total Washington	31	9270
Total for Region	801	1540000

EXTENT OF MODOC BUDWORM
IN 1982 BY REPORTING AREA

REPORTING AREA	NUMBER OF INFESTATION CENTERS	ACRES OF DEFOLIATION
Total Fremont NF	6	1760
Total Winema NF	1	3190
Total Oregon	7	4950
Total for Region	7	4950

Pine Butterfly, *Neophasia menapia* (Felder and Felder)

Pine butterfly damage on ponderosa pine was reported in three pockets in Oregon on the Ochoco National Forest and the Warm Springs Indian Reservation. This is the first report of defoliation in Oregon and Washington by this insect since the annual aerial surveys began in 1947.

EXTENT OF PINE BUTTERFLY
IN 1982 BY REPORTING AREA

REPORTING AREA	NUMBER OF INFESTATION CENTERS	ACRES OF DEFOLIATION
Total Ochoco NF	2	2630
Total Warm Springs IR	1	20
Total Oregon	3	2650
Total for Region	3	2650

Larch Casebearer, *Coleophora laricella* (Hbn.)

Populations levels of larch casebearer varied over the region during 1982. Some heavy defoliation occurred in the Central Oregon Cascades. In other larch stands in Oregon, populations were generally at a lower level than last year with light to moderate defoliation. In northeast and north-central Washington, the population level is also low. Defoliation was generally light. Populations in the Cascade Mountains of Washington caused very light defoliation in 1982.

Larch Looper, *Semiothisa sexmaculata sexmaculata* (Packard)

The larch looper defoliated 23,590 acres of larch and associated species on the Colville National Forest and adjoining State and private lands. The defoliation declined from 60,550 acres in 1981 and occurred in the same general area where defoliation was detected since 1979. The infestation is expected to continue its decline.

EXTENT OF LARCH LOOPER IN 1982
BY REPORTING AREA

REPORTING AREA	NUMBER OF INFESTATION CENTERS	ACRES OF DEFOLIATION
Colville NF	40	23,590
Total Washington	40	23,590
Total for Region	40	23,590

Gypsy Moth, *Lymantria dispar* (L.)

In Washington, adults have been now trapped in 22 locations in 6 counties. Results of eradication by trapping-out at several localities in the Puget Sound area ranged from completely successful to the opposite, where capture rates in survey traps increased in 1982.

In Oregon, approximately 10 square miles were aerially sprayed with Sevin 4-Oil® in a very successful eradication attempt in South Salem. Traps captured moths in Albany, Corvallis, North Salem, Lowell, and Turner. Some of these captures were single individuals and were thought to be "hitchhikers" into the area. Capture rates in the Portland area were much lower this past year.

Douglas-fir Needle Midge, *Contarinia* sp.

Moderate defoliation of Douglas-fir in eastern Oregon was caused by one or more species of *Contarinia*. On the Wallowa-Whitman and Umatilla National Forests, 38,810 acres of defoliation were recorded on the aerial detection survey.

Needle Miner, *Coleotechnites* sp.

A species of *Coleotechnites* caused defoliation on 1,490 acres of ponderosa pine on the Winema National Forest in southern Oregon.

Cone and Seed Insects

West of the Cascades Douglas-fir cone crops were generally good and abundant pollen insured high seed set. Cone and seed insect impact on viable seed in producing seed orchards ranged from 4 to 16 percent. Douglas-fir cone gall midge, *Contarinia oregonensis* Foote, Douglas-fir cone scale midge, *Contarinia washingtonensis* Johnson and *Camptomyia pseudotsugae* Hedlin and Johnson, caused minor damage in the orchards surveyed. Douglas-fir seed chalcid, *Megastigmus spermotrophus* Wachtl, at one orchard reduced filled seed yield by 16 percent. Both the Douglas-fir cone moth, *Barbara colfaxiana* (Kearfott), and fir coneworm, *Dioryctria abietivorella* (Grote) caused very little cone and seed damage.

Cone production in 1983 is expected to be light; as a result, cone and seed insect impact will seriously regulate viable seed production in seed orchards and natural stands.

DISEASE CONDITIONS - 1982

Forest Diseases

Tree root disease incidence is becoming more evident in Pacific Northwest forests. The number of people trained to recognize root diseases is steadily increasing, thereby improving the detection effort. However, the actual incidence of root diseases is increasing, often in direct response to human activity. Laminated root rot, *Armillaria* root rot, annosus root and butt rot, and black stain root disease repeatedly have been found causing damage, especially throughout the mixed-conifer types of the Cascade Range from California to Canada. Root disease losses on commercial forest lands of all ownerships in Oregon and Washington in 1982 are estimated to be 130.6 million cubic feet. Annual mortality losses due to all root diseases have been estimated at 0.1 percent of the total white and grand fir volume in Oregon and Washington.

Laminated root rot, caused by *Phellinus weirii*, is estimated to have removed about 5 percent of the West Side Douglas-fir type from production. The acreage of infestation is probably closer to 10 percent. Damage is also severe in some grand and white fir stands.

Annosus root and butt rot caused by *Fomes annosus* is responsible for extensive losses in many partially-cut white fir stands in southern and eastern Oregon. Infection levels of as high as 77 percent of all white fir have been found in stands on the Fremont National Forest. This disease appears to be particularly severe in stands that were formerly dominated by ponderosa pine but have been invaded by white fir as a result of strict fire exclusion policies. Most loss is due to outright tree mortality.

Armillaria root rot continues to appear throughout the region. The most serious losses to this disease occur on the East Side. Serious losses on the West Side are usually confined to stressed stands; for example, off-site plantings. Plots have been established to monitor the effects of precommercial thinning in *Armillaria*-infected Douglas-fir, Shasta red fir and ponderosa pine stands. Direct control through stump and root removal is being practiced in severely infected eastern Washington stands.

Numerous new findings of black stain root disease have been made in second-growth Douglas-fir stands. In southwestern Oregon, where this is by far the most commonly encountered disease in Douglas-fir plantations, it appears to be especially damaging where disturbances have occurred, especially in roadside Douglas-firs cut back by mechanical choppers. A recently completed survey shows that 38 percent of the thinned and 9 percent of the unthinned Douglas-fir plantations on the Siskiyou National Forest have some black stain. A survey in progress indicates that a greater proportion of plantations have disease and infection centers and losses are greater on the Coos Bay District, Bureau of Land Management. There is beginning to be concern about the apparent association between occurrence of this disease and precommercial thinning.

Phytophthora root rot caused, by *Phytophthora lateralis*, continues to cause widespread mortality of Port-Orford cedar in southwestern Oregon. The USDA Forest Service is evaluating the possibility of screening Port-Orford cedars for resistance and/or tolerance to the disease.

Dwarf mistletoes are all too common pathogens in most of the Pacific Northwest. However, as stand management intensifies, losses due to this group of disease-causing organisms are declining. Dwarf mistletoes caused an estimated loss of 132.7 million cubic feet of timber in Oregon and Washington in 1982. A model for estimating present volume and projected reductions in yield, along with economic analysis, has been developed for dwarf mistletoe-infected Central Oregon lodgepole pine. Programs are written for popular handheld programmable calculators. Growth loss and associated mortality is high in some dwarf mistletoe-infected grand fir stands in Central Oregon. A Forest Pest Management evaluation revealed trees with high live crown ratios and low dwarf mistletoe ratings grew the fastest over the last 25 years, while trees with low live crown ratios and high dwarf mistletoe ratings grew the slowest. Other organisms besides dwarf mistletoe, such as *Cytospora abietis*, fir engravers, and root diseases also contribute to tree mortality.

White pine blister rust continues to be the most important disease of western white and sugar pines. Annual losses to white pine and sugar pine blister rust in western Oregon are estimated to be 15 million cubic feet. Gains are being made through identification of resistant trees and ratings of sites for infection hazard. Hazard rating programs developed for popular handheld programmable calculators predict the blister rust infection hazard and disease losses for specific sites.

Stem decay fungi still consume enormous volumes of wood with the majority of losses occurring in old-growth stands. Significant losses are occurring in younger stands as wounding of residual trees during stand entries both activates dormant infections and creates excellent infection courts. Programs for handheld calculators have been developed to estimate percentages of infection and decay in white and grand fir understories, two of the most defective species in the Region.

The incidence of foliage diseases was much reduced in 1982 compared to 1981. An outbreak of *Pucciniastrum epilobii*, the cause of fir-fireweed rust, was observed on several hundred acres of Pacific silver fir in the northern Washington Cascades. Little damage is anticipated.

Swiss needle cast, caused by *Phaeocryptopus gaumanni*, continues to plague Douglas-fir Christmas tree growers in western Oregon and Washington. Many growers are spraying fungicides to prevent infection. The disease is also widespread in Douglas-fir stands dedicated to timber production, but damage is usually inconsequential. Managers of Douglas-fir seed orchards are becoming concerned about the effects of defoliation on cone and seed production. Some seed orchards have been sprayed with fungicides to prevent infection.

Dutch elm disease has only been reported in Walla Walla County in Washington. In Oregon, the disease is found in Nyssa, Ontario, and Union Counties.

The incidence of ponderosa pine needle blight, caused by *Elytroderma deformans*, remains high around Republic, Washington, and in the Maury Mountains south of Prineville, Oregon. A biological evaluation done this year identified a high level of *E. deformans* infection being present in a 520-acre survey block near Winthrop, Washington.

Phytophthora root rot on Douglas-fir seedlings was found in several nurseries in Oregon and Washington. Infection and mortality was confined primarily to low or poorly drained areas of nursery beds. Several species of *Phytophthora* were identified on diseased roots. Application of the fungicide metalaxyl seemed to help reduce losses.

Fusarium root rot, caused by *Fusarium oxysporum* f. sp. *pini*, resulted in mortality of sugar pine seedlings at the J. Herbert Stone Nursery. Further losses occurred when 2-0 seedlings with root decay were culled. *F. oxysporum* was also responsible for the death of Douglas-fir seedlings in one area of the Wind River Nursery that had been inadequately fumigated.

Beds of 3-0 western redcedar browsed by deer at the Wind River Nursery suffered dieback caused by a fungus identified tentatively as *Phoma prunicola*. Up to as high as 47 percent of the seedlings were damaged in five seedlots. Damage incidence increased with seedling stocking density and decreased with increasing seedling top size.

Other diseases observed at the Wind River Nursery included gray mold (*Botrytis cinerea*) and larch needle cast (*Meria laricis*). Gray mold occurred in 2-0 noble fir beds that had not received preventative sprays; damage incidence increased with seedling density. All 2-0 larch were infected with *Meria laricis*.

Root galling occurred on a small proportion of incense cedar seedlings at the J. Herbert Stone Nursery. The causal agent has been identified tentatively as the bacterium *Agrobacterium tumefaciens*, which is the cause of crown gall. *A. tumefaciens* probably is introduced through root pruning wounds.



